SOUTH TAHOE
PUBLIC UTILITY DISTRICT

1275 Meadow Crest Drive • South Lake Tahoe, CA 96150
Phone: (530) 544-6474 • Facsimile: (530) 541-0614

MEMORANDUM

March 12, 1999

To: Rochelle Nason, League to Save Lake Tahoe
Stan Hansen, Heavenly Ski Resort
Steve Teshara, Lake Tahoe Gaming Alliance

From: Robert Baer, General Manager

Subject: Recycled Water Export Pipeline

Chris Strohm and Duane Wallace requested that I send you the following information about the District's operations.

Technical Advisory Committee's Report

We have asked the committee of engineering experts who developed the original replacement / repair schedule to evaluate the District's present plan to replace the entire pipeline by 2004. In the attached report, the committee concludes:

> "...the replacement of the existing export pipeline should be completed as quickly as economically feasible by the District. This will provide the safest approach to reducing the potential for discharges (leaks) in the Tahoe Basin and eliminate additional risks associated with the repair approach. This should provide the greatest protection of the Tahoe Basin environment."

B-Line Phase II

This repair option would entail equipment entrance and excavations into the USFS Resource Natural Area (RNA). The RNA is a very environmentally sensitive area in which the USFS precludes all special uses other than recreational. To even place the new pipeline along the shoulder of State Highway 89, the STPUD had to agree to place temporary erosion control fencing the length of the project to ensure that absolutely no entrance into the RNA would occur.

B-Line Phase III

This repair option would entail equipment entrance and excavations along the very steep existing alignment. Both the USFS staff and the Lahontan Regional Board staff involved did not favor disturbing this alignment due to scenic impacts to the Highway 89, and water quality projects due to the steepness of the terrain.

In conclusion, routes for both the B-Line Phase II and III projects were selected to minimize environmental damage. Repair options would cause much of the environmental damage avoided by new route selections in order to simply postpone construction of the new pipeline for approximately 12 years.

Spill Record

The attached information was originally presented to the Regional Board in 1996. Updated information indicated one reportable spill since 1996.

Professional Awards

A listing of professional awards received by the District since 1993. Recent awards that are relevant to our discussions are:

1998 Collection system of the Year
1997 Government Finance Officers' Award for Financial Reporting

We are particularly proud of these awards because we are reviewed by our peers using strict criteria.

If you have any questions about the material or need additional information, please feel free to contact me.

RGB/ks

Enc.

cc: Jane Freeman, US EPA, Lake Tahoe Team
Trish Ronald, League to Save Lake Tahoe
Dwight Steele, League to Save Lake Tahoe

CAROLLO ENGINEERS

Dedicated to creative, responsive, quality solutions for clients we serve.

March 2, 1999
300.80

Mr. Robert Baer, General Manager
South Tahoe Public Utility District
1275 Meadow Crest Drive
South Lake Tahoe, California 96150

Subject: Replacement Schedule for the "A" and "B" Line Reaches of the Treated Effluent Export Pipeline

Dear Mr. Baer:

The purpose of this letter is to:

1. Discuss the repair/replacement schedules recommended by the Technical Advisory Committee[1] and Carollo Engineers[2] and the effects that assumptions have on the recommended schedules,
2. Identify which schedule would likely result in fewer discharges (leaks) of treated effluent within the Tahoe Basin and,
3. Recommend a course of action for the replacement of the remaining reaches of the treated effluent export pipeline.

Background

Work on the A and B-Line reaches of the existing export pipeline has been ongoing since the completion of the Technical Advisory Committee report[1] and the addendum completed by Carollo Engineers[2]. The South Tahoe Public Utility District has made the following important strides in addressing the recommendations contained in the original two reports.

1. The recommended pressurized surge tank has been installed on the B-Line. While this will not repair pipe already damaged, it will protect newly installed pipe and prevent additional damage from occurring in the future.
2. The District has replaced the B-Line section (using the route identified in the original TAC report) from existing station 45+ 00 to Station 81+ 50 (3,650 lineal feet).

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[1] In its' report "Luther Pass Export Pipeline (B-Line) Repair/Rehabilitation Technical Advisory Committee Recommendations (January 1996)"

[2] In our subsequent "Final Letter Report Addendum to the Technical Advisory Committee Report (August 1996)"

3. The District has installed approximately 51,000 lineal feet of new A-Line (replacing almost 90 percent of the existing A-Line).
4. The District has completed investigations to determine additional sections of the B-Line that require replacement. This has resulted in the completion of plans and specifications for the replacement of approximately 10,000 lineal feet of B-Line that parallels the Grass Lake Natural Resource Area. A new route has also been identified for the replacement of the existing B-Line between the Luther Pass Pump Station and station 45+ 00.
5. Plans and specifications have been completed for the replacement of the final 5,000 lineal feet of the existing A-Line.
6. The District has also been conducting an ongoing, informal, evaluation of the applicability of different repair methods that could be used to extend the life of the existing pipeline following the issuance of the TAC Report. It has been the District's experience that cutting in access for, and completing repairs creates more problems than it resolves. These problems include gaining access to the existing pipeline, draining and filling the pipeline while repairs are completed, cutting into the old pipeline to complete repairs, etc. (The problems associated with repairing the existing pipeline are discussed more fully later in this letter). Based on this experience, the District feels that the goal of providing the greatest protection of the Tahoe Basin environment is better achieved by completing the replacement of the remaining pipeline rather than completing an extensive repair program.

Development of Orignal Repair/Replacement Schedules

The condition of the A and B-Line reaches of the existing export pipeline was evaluated using District records of past leaks, video tapes of sections of the existing pipeline and visual inspections of three pieces of the pipeline that were removed to complete leak repairs. It is important to note that:

1. The Technical Advisory Committee (TAC) evaluated only the B-Line reach of the export pipeline. The A-Line reach was included in the schedule developed by the TAC (without changing the TAC's recommendations) in the subsequent report completed by Carollo Engineers.
2. Video tapes covered only short sections of the different reaches. The existing export pipeline did not have access for video equipment. "Tees" had to be cut into the existing pipeline in order to make the videos that were completed.
3. Only three pieces of the existing export pipeline were physically available for evaluation.
4. The most complete record of pipe condition was the leak record kept by the District that established the location and probable cause of each leak experienced.

The TAC and Carollo Engineers had to assume that the available information was representative of the entire reach. As anyone involved in design and construction can attest, while this is a common evaluation assumption it also contains some risk. For example, a test bore is commonly used to describe the soil conditions in a general area. In reality the bore only provides information on the soils from that particular boring. There

could be boulders right next to the bore hole that were not discovered. Both the A and B-Line reaches were divided into different sections based on the review of available video tapes, pipe pressure rating, location, joint type and observed deterioration. **It was determined that the entire A and B-Line reaches of the export pipeline needed to be replaced or rehabilitated.** The South Tahoe Public Utility District (District) could not afford the estimated $20 to $25 million to replace both reaches at the same time. The proposed rehabilitation (repair) methods were included to extend the life of the existing pipeline (up to 15 years in 1995) until replacement could economically occur. Subsequent work, including problems associated with the completion of repairs (discussed elsewhere), has shown that the appropriate rehabilitation is to replace the existing pipeline sooner rather than later.

The schedule for repair and replacement of each section was then prioritized based on what was known with a view to deferring actual replacement until money was available for each project. Making one section a lower priority than another did not mean that it was in good condition, it simply meant that, based on what was known, it was not in as poor condition as those sections receiving a higher priority. It is very important to note that based on the information available and the assumptions listed, both reports came to the same conclusion. **The ultimate "repair" in each instance was the replacement of the pipeline reach being evaluated.** Where repairs were called for it was only to extend the "life" of the existing pipeline until replacement could be completed.

There was one other significant assumption; it was assumed that there were no grant monies available. This meant that the District would have to pay for each of the required projects. It was not economically feasible for the District to replace the entire A and B-Line reaches in the same construction season, nor even in consecutive seasons. Schedules were developed based on the prioritized reach sections that would allow the District to complete the required replacement in an orderly fashion, addressing the higher priority items first. It was felt that this at least limited the potential for leaks. **In each case, cost considerations extended the schedule for replacement rather than reduced it. The availability of Federal assistance would have resulted in a significantly compressed schedule for the complete replacement of the A and B-Line reaches. In fact, the ideal schedule would have been based not on cost but on how much work could be completed in consecutive construction seasons.**

Potential Leaks to the Tahoe Basin

It now appears that there are two potential schedules for the replacement of sections of the A and B-Line reaches that still need to be replaced: 1) the original schedule identified in the TAC and Carollo reports and, 2) an accelerated replacement schedule based on the availability of Federal monies. **The primary concern is which schedule would result in the fewest number of discharges (leaks) of treated effluent in the Tahoe Basin? Completing the replacement of the existing export pipeline with an accelerated schedule will result in fewer discharges (leaks).** The following supports this conclusion.

1. As stated earlier, the extended schedule is based on assumptions that may or may not be true regarding the homogeneous condition of the existing export pipeline. It is likely that there are weak points in the existing pipeline that we do not know about.
2. The existing export pipeline was not constructed with access for inspection or repair operations. The completion of additional video inspections in order to identify the location of required repairs and to provide access for the completion of the repairs once the location is identified will require cutting in access "tees" at least every 1,000 lineal feet. Cutting in access "tees" requires the shutdown of the export system and the drain back of all the effluent in the pipeline to the treatment plant (or Luther Pass Pump Station depending on location). Once the "tee" has been installed the export system has to be brought back on line and up to operational speed. Historically, it has been this draining and filling process that has stressed weak points in the pipeline and resulted in leaks. In addition, the "tee" installed in this manner is also a potential weak point that could fail at a later date. This is especially true in the high pressure portions of the existing pipeline (up to 600 psi).
3. Access to the existing export pipeline is limited at best and a great deal of work will be involved in just reaching and excavating the existing pipeline. There are serious environmental concerns that would have to be addressed prior to accessing the pipeline. This is especially true of the B-Line where it crosses Forest Service Land and the Grass Lake Natural Resource Area. In addition access to the "tees" will have to be maintained after being constructed.
4. Anytime a new hole is cut into an existing pipeline it provides additional opportunity for leaks and corrosion.
5. The repair work would be abandoned when the new pipeline is replaced. There would be no salvage value to the costs expended in completing the repairs.

None of the above is applicable to the installation of a replacement pipeline. Replacement pipelines include the installation of access for future inspection and possible repairs. They are located such that they are accessible from existing roads. The routing of replacement pipelines has been developed to limit environmental damage. The District has worked in concert with the Tahoe Regional Planning Agency (TRPA), Lahontan Regional Water Quality Control Board (RWQCB) and the U.S. Forest Service (and others where applicable) to develop the replacement routes. The new installation includes correctly sized air and vacuum relief valves used to eliminate stresses caused by filling and draining the pipelines. There would be no need for new holes to be cut in the new pipeline. All outlets would be installed as part of the design and would be factory sealed against corrosion.

Recommended Course of Action

Based on the original reports and the preceding **the replacement of the existing export pipeline should be completed as quickly as economically feasible** by the District. This will provide the safest approach to reducing the potential for discharges (leaks) in the Tahoe Basin and eliminate additional risks associated with the repair approach. This should provide the greatest protection of the Tahoe Basin environment.

Please contact us if you have any questions or if you need further clarification.

Very truly yours,
CAROLLO ENGINEERS

Walter Howard, P.E.

Jack Burnam II, P.E.

Hank Galka, P.E.

EXPONENT FAILURE ANALYSIS

Paul Johnston, PhD
Principal

FLOW SCIENCE, INC.

E. John List, PhD
Principal

The signatories of this letter represent approximately 135 years of combined working experience in the evaluation and repair/replacement of infrastructure. Paul Johnston, PhD was involved only in the original TAC work. Each of the other signatories was involved in the original TAC work as well as in the completion of the subsequent work listed.

Principal Signature for CAROLLO ENGINEERS

Robert A. Gillette, P.E.
Principal

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South Tahoe Public Utility District
Wastewater System

South Tahoe Public Utility District's wastewater system consists of three components:

Collection System - Transfers raw sewage from homes and businesses to the treatment plant.

Treatment Plant

Export System - Transports recycled water to Alpine County for storage and use on ranch lands.

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1) Collection System - No. of Spills (From 1996 Presentation to Lahontan)

1995 State Benchmarking Study
- Five top ranked agencies
- 158 - 3,196 miles of gravity lines
- 1.5 to 31.6 spills/100 miles

Average = 5.1 spills/100 miles

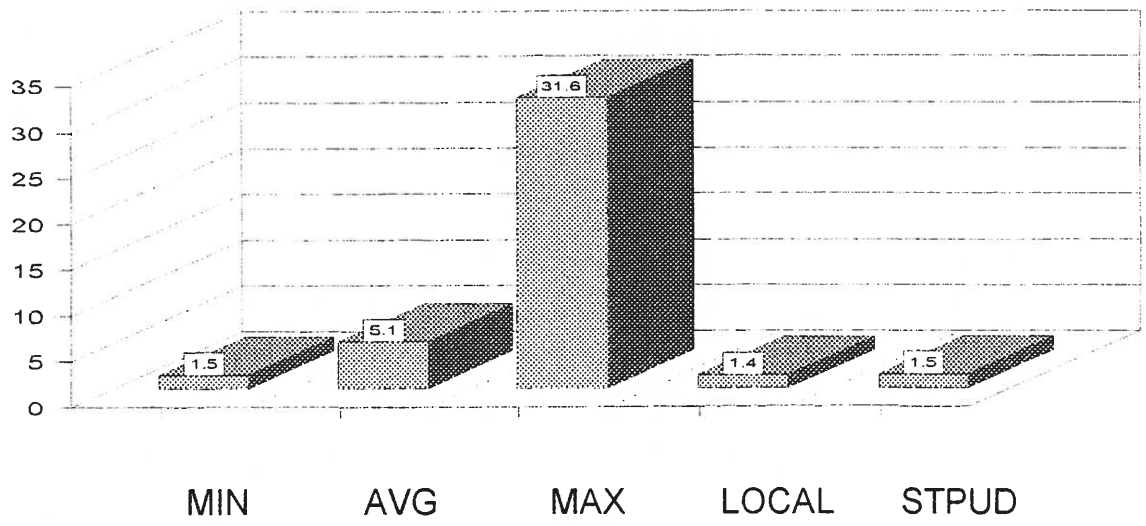
Tahoe City PUD Collection System
- 180 miles of gravity sewer
- 20 pump stations
- 3 to 4 spills per year

3.5 / 180 = 1.4 spills/100 miles
1993 Collection System of the Year

South Tahoe Public Utility District Collection System
- 420 miles of gravity sewer
- 35 pump stations
- 6.2 spills per year

6.2 / 420 = 1.5 spills/100 miles
1998 Collection System of the Year
One Reportable Spill in 1998

Comparison of Spills



2) Treatment Plant

- Spills
  1986 (high flows)
  1996 (broken pipe)

- Water Quality
  3 violations since 1989
  No violations since May, 1995

3) Export System

- Last spills from District operations - 1995
  (Pipe sections have been replaced in 1996 and 1998)

- Last spills from contractor testing in 1995

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South Tahoe Public Utility District
Professional Awards

- 1998 California Water Environment Association, Sierra Section, Collection System of the Year Award
- 1998 California Water Environment Association, Sierra Section, Operator of the Year Award for District Employee Jim Capitani
- 1998 California Water Environment Association Safety Award over 76 Employees
- 1998 California Sanitation Risk Management Authority Workers' Compensation Program Award for Lowest Claims Frequency Rate (Large Member Agency Category)
- 1997 Government Finance Officers Association Award of a Certificate of Achievement for Excellence in Financial Reporting for Comprehensive Annual Financial Report for the Fiscal Year Ended June 30, 1997
- 1997 California Water Environment Association Safety Award over 76 Employees
- 1996 Government Finance Officers Association Award of a Certificate of Achievement for Excellence in Financial Reporting for Comprehensive Annual Financial Report for the Fiscal Year Ended June 30, 1996
- 1996 California Water Environment Association Safety Award over 76 Employees
- 1996 Wastewater Treatment Plant, State of California's Operator of the Year Award for District Employee Matt Persic
- 1996 Tahoe Regional Planning Agency's Award for Best Public Service Project
- 1995 California Water Environment Association Safety Award over 76 Employees
- 1995 California Water Environment Association Public Education Award of the Year, Small Budget Category

- 1995 The Government Finance Officers Association Award of a Certificate of Achievement for Excellence in Financial Reporting for Comprehensive Annual Financial Report for the Fiscal Year Ended June 30, 1995
- 1994 United States Environmental Protection Agency's National Award for Outstanding Wastewater Treatment Facility Operations and Maintenance for Large Non-Discharging Plant Category (Wastewater Excellence Award for the Best Treatment Plant in the United States)
- 1994 California Energy Commission chose the District as a Showcase Plant
- 1993 State of California Theodore Roosevelt Environmental Award for Natural Resources Management
- 1993 California Water Pollution Control Association State of California Treatment Plant of the Year Award